The Autumn butterflies during an almost continuously fine and warm September were prolific in some species and uncommonly scarce in others. By the 20th *Vanessa atalanta* L. was in good numbers, especially along the coast between Bovisand and Heybrook Bay, and *Aglais urticae* L. was adundant everywhere. Also in this locality the later brooded *L. phlaeas* were now very plentiful and I took a nice female ab. *discoelongata*. One large and fresh female *Vanessa cardui* L. visited my garden on the 16th, and this was one of no more than half a dozen seen throughout the whole summer. I hunted in vain for *Colias Croceus* F. 1969 was a good "Clouded Yellow Season" and I counted over three hundred in October when it became increasingly abundant along the coast near Plymouth right up until the 21st when the weather broke and it disappeared at once. In September and October, 1970, I saw only seven. Despite the weather remaining dry and warm until early November the season had closed abruptly and in some respects disappointingly.

Of the species I was unable to observe due either to the distances involved or the inability to get away at the right time I have heard encouraging reports, and these include *Thymelicus lineola O.* near Salisbury, *Leptidea sinapis* L. near Exeter, *Strymonidia pruni* L. and *Thecla betulae* L. near Oxford to mention some, but I would welcome any information upon the localities and status of *Carterocephalus palaemon* P. and *Coenonympha tullia* in England.

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Regarding *galathea*

By Charles F. Cowan

I was stationed at extra cover and my best friend was at square leg. It was my last game of cricket at school at Newnham, on the outside of the horse-shoe bend of the river Severn below and west of Gloucester. Suddenly, as a ball was about to be bowled, a butterfly passed diagonally across the pitch and I shouted "Marbled White"! The game resumed, but I was later given a two-fold reprimand, for inattention and for spreading false reports.

Now that was in July 1926; *Melanargia galathea* L. had "never" been known in the neighbourhood, and I had never seen one before. Yet my friend supported me, and I was vindicated (in part, at least) in the following year when I heard that the species was common round that field. It was still there in 1939, and it is shown as still in the same "square" (32/61) in 1960, in the fascinating *Provisional Atlas* published in 1970. But, sadly, it is not shown in 1971 by A. D. R. Brown (vol. 83: p. 107).

Why should such changes occur? Is *galathea* vulnerable? On what does it feed, and what are its ecological requirements? Two grasses are generally listed as its natural food;

Phleum pratense and *Dactylis glomerata,* the former having been given by Stephens in 1827 and the latter soon afterwards. Both these are shown in the *Atlas of the British Flora* to be distributed abundantly throughout Britain. Yet *galathea* has always been restricted, certainly since Edward Newman's *British Butterflies* of 1870, to the chalk and limestone south of a line Tenby to the Wash, with an outpost in the Yorkshire Wolds. Moreover, within these bounds it is confined to small perennial enclaves. In captivity it has been found to eat "any" kind of grass. Why is it so local?

Its ovipositing habits will bear examination. E. Newman (1870: 78) quoted the observation of G. C. Bignell of Plymouth: "settles indiscriminately on any leaf or stalk that may be nearest at hand, and drops her eggs at random, careless of what species of grass may happen to receive it; only one egg is extruded at a time, [then] the female flies a few inches or a few feet and repeats the operation". These observations were made from watching a number of females, apparently in the wild. Except by Frohawk, these details do not seem to have been repeated since, later authors being content cautiously to say that the eggs "are not attached to anything". However, within the last four years a well illustrated book with rather sketchy text states: "The females have the peculiar habit of dropping the eggs quite casually amongst the grass and herbage as they fly". This is a very different method, which must be difficult to observe. Precise details would be interesting.

In captivity, my female was alternately fluttering and feeding in the sunshine of the afternoon of 17th July 1971, in a large perspex tank inverted over a black tray with some grass and flowers. A cloud hid the sun and she settled on a stem, with wings closed. After 25 seconds she shifted her legs and, 15 seconds later, with a loud and satisfying "click, click", an egg bounced on the tray and rolled away. After another 25+15 seconds of the same routine a second egg followed, and in all four eggs were dropped from the same perch with exactly the same procedure before the sun reappeared and she resumed fluttering. The instant hardening of the eggs is a remarkable adaptation; they actually do bounce. Being above the insect, I was unable to observe the nature of the slight but definite shift closely, nor the process of extrusion.

I would not agree that the female drops her eggs either "casually" or "regardless of where they fall". Nature is wise, and "Mother knows best" and I suspect she has a very shrewd instinct that her seed will fall on suitable ground. There was certainly a good steamy scent of hay in the tank where my female laid, an atmosphere which may act as one of her "releasers". The restricted range of the species despite its ability to live on almost any kind of grass may indicate very circumspect laying habits.

This method of ovipositing is a specific character. The

related *M. russiae suwarovius* (=*japygia*) used to be found at Puszta Peszer in Hungary, and Frohawk & Rothschild (1913, *Entomologist* **46**: 275-278) observed it, the former giving a beautiful sketch. Alighting near the tip of a grass blade which bends over with her weight, the female swings underneath sideways by her hinder legs, curls her abdomen up in a circle and lays on the upperside of the blade between her feet. As she flies away the blade jerks upright and the eggs (up to four) remain fixed. Various plants were so used, but the larvae were found in this case to prefer *Poa annua.*

The eggs of *galathea* are adapted for free-laying in that they are both hard and round. Mine were much more nearly spherical than in any illustration I have seen of them, with minute flat faces and two almost imperceptible flat "ends" (which could have been formed in bouncing). Minute golf balls were immediately thought of. The Ringlet (*A. hyperantus* L.) also lays free eggs. My two were prolific in the same tank with *galathea.* The eggs were easily identifiable, as those of *galathea* are at least double the size of any other of our Satyridae, and chalky white. Those of hyperantus are normal in size and pale greenish white, and I am not sure that they are immediately hard, not having observed actual laying. Incidentally, the "adhesive" of several other of our Satyridae is very weak. In particular my specimens of the Gatekeeper (*M. tithonus* L.) and the Meadow Brown (*M. jurtina* L.), which all showed a marked preference for laying on the inverted bowl instead of on the plants of grass provided, used so weak a fixing agent that the eggs were easily removed with a paintbrush.

Everything in the garden is not invariably lovely. With several other males I was attracted to a female *galathea* on the sunny afternoon of 13th July 1971, at Ivinghoe Beacon. About a dozen of us converged on her, then all but me hurried on. I picked her up. Her feebly agitated wings were fully grown but still limp, and the tip of her abdomen was pierced by the beak of a very large immature brown Hemipterid, which must have caught her very soon after emergence. She did not recover. The bug changed in captivity to its penultimate instar but then unfortunately died, and has not been identified.

To complete the record, my female was observed *in cop.* on 12th July 1971 and was captured when the pair parted. Eggs laid on 16th-17th July hatched on 9th-11th August, remaining identical in appearance during those 25 days. The first indication of hatching was a tiny black dot which rapidly increased in size as the larval head emerged. Half the shell appeared to be eaten. The larvae were immediately released onto "grass" (regardless of the species) in the corner of my garden. The Marbled White is not one of the 21 species seen flying in my garden during the last six years, nor have I seen one within a mile of here.